REMARKS

The Office Action dated May 26, 2004 has been received and carefully noted. Applicants have previously responded to that Office Action in a Response filed July 26, 2004, where that Response was not entered, as indicated in the Advisory Action of October 4, 2004. The following remarks, and the above amendments to the claims, are submitted as a full and complete response thereto.

Claims 1-40 are pending in the above-cited application and are again submitted for reconsideration. Claims 1-4, 7, 8, 11, 16-19, 22, 32 and 36-38 have been amended to more particularly point out the instant invention or to place claims in independent form. The Office previously indicated that claims 3-5, 11-15, 18-20, 25, 26, 32 and 36-40 contained allowable subject matter and claims 3, 4, 18, 19, 32 and 36-38 have been placed in independent form. Thus, Applicants respectfully assert that claims 3-5, 11-15, 18-20, 25, 26, 32 and 36-40 should be allowed and Applicants respectfully request such an indication in the next communication from the Office.

Claims 1, 2, 6-10, 16, 17, 21-24 and 27-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Giroux et al.* (U.S. Patent Publication 2002/0089933) in view of *Yang et al.* (U.S. Patent No. 6,097,698). Claims 30, 31 and 33-35 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Giroux et al.* in view of *Yang et al.* and Basso et al. (U.S. Patent No. 5,787,071). The above rejections are respectfully traversed according to the remarks that follow.

The present invention is directed, according to claim 1, from which claims 2 and

6-10 depend, to a shared memory packet switching device having a plurality of receive ports for receiving data packets, and a plurality of transmit ports for transmitting data packets. The switching device includes a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports, a plurality of input logic units with each of the input logic units being associated with one of the receive ports, and with each of the input logic units being operative to determine whether the associated receive port is saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, a packet routing control unit communicatively coupled with the input logic units, and being operative to determine a destination one of the transmit ports for each of the received data packets and at least one output logic unit associated with at least one of the transmit ports, the output logic unit being communicatively coupled with the packet routing control unit, and being operative to determine whether the associated transmit port is congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the associated transit port exceeds a predetermined congestion threshold value, and also being operative to generate an associated output full signal indicative of whether the associated transmit port is congested. The input logic units is responsive at least in part to each of the output full signals, and is further operative to cause a selected packet received via the associated receive port to be dropped if the associated receive port is currently saturated and the output full signals indicate that a destination transmit port

associated with the selected packet is currently congested.

The present invention is directed, according to claim 16, from which claims 17 and 21-24 depend, to a shared memory packet switching device having a plurality of receive ports for receiving data packets, and a plurality of transmit ports for transmitting data packets. The packet switching device includes a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports, a plurality of input logic units with each of the plurality of input logic units being associated with one of the receive ports, and with each of the input logic units being operative to determine whether the associated receive port is saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, a packet routing control unit communicatively coupled with the at least one input logic unit, and being operative to determine a destination one of the transmit ports for each of the received data packets, the packet routing unit being further operative to generate a plurality of transmit signals each being associated with one of the transmit ports, and to assert a particular one of the transmit signals when a received packet is to be transmitted via the associated transmit port and at least one output logic unit associated with at least one of the transmit ports, the output logic unit being communicatively coupled with the packet routing control unit, and being operative to determine whether the associated transmit port is congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the associated transit port exceeds a predetermined

congestion threshold value, and also being operative to generate an associated output full signal indicative of whether the associated transmit port is congested. The packet routing control unit is also responsive to the output full signals, and is operative to generate a plurality of filter signals for indicating that a received packet is destined for a congested one of the transmit ports. The input logic units is further responsive to each of the filter signals, and is further operative to cause a selected packet received via the associated receive port to be dropped if the associated receive port is currently saturated and the filter signals indicate that a destination transmit port associated with the selected packet is currently congested.

The present invention is directed, according to claim 27, from which claims 28-31 and 33-35, to a process of controlling the flow of data through a shared memory packet switching device having a plurality of receive ports for receiving data packets, a plurality of transmit ports for transmitting data packets, and a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports. The method includes the steps of receiving a packet via an associated one of the receive ports, determining whether the associated receive port is currently saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, determining a destination one of the transmit ports associated with the received data packet, determining whether the destination transmit port is currently congested by determining whether a number of packets currently stored in the shared memory that are to be

transmitted via the destination transmit port exceeds a predetermined congestion threshold value and dropping the received packet if the associated receive port is currently saturated and the destination transmit port is currently congested.

As recited in the present specification, among the advantages of the devices and processes according to the claimed invention is that an uncongested transmit port of the device is not starved as a result of flow control functions initiated at a saturated receive port as a result of heavy traffic through the device between the saturated receive port and a plurality of transmit ports including the uncongested transmit port and other transmit ports, some of which may be congested. It is respectfully submitted that *Giroux et al.* and *Yang et al.*, taken either individually or in combination, fail to disclose or suggest all of the the elements of the presently pending claims. Therefore, it is further submitted that *Giroux et al.* and *Yang et al.* fail to provide at least the above-discussed advantages of the claimed invention.

Giroux et al. is directed to a method and system for detecting and controlling congestion in a multi-port shared memory switch. The switch receives data from various sources and temporarily stores the data in a shared memory buffer. The switch also includes a local congestion monitoring means for setting and monitoring queue length thresholds for each output queue. The Office Action acknowledges that *Giroux et al.* fail to teach determining whether the associated receive port is currently saturated, and thus also cites *Yang et al.*

Yang et al. is directed to a switching node that has a control element that discards cells if the cell occupancy of the buffer exceeds a predetermined threshold level. The Office Action alleges that *Yang et al.* teaches "in effect, the system determines if a certain input has exceeded it fair share of bandwidth," and acts accordingly. Applicants respectfully assert that *Yang et al.* fails to teach or suggest what has been alleged, as discussed below.

In *Yang et al.*, it is clear that the buffer is separated based on the output communication links and the buffer is not monitored on the basis of the input ports. *Yang et al.* recites, at column 5, lines 38-42, "it will be assumed herein that the buffer 32 comprises a plurality of buffer sections, each of which is associated with one of the separate output communication links 13(p)(o)." In other words, once a cell is received and stored in the buffer, which port it was received from is not monitored. The cells are dropped in order to maintain service rate guarantees for output virtual circuits.

Claim 1 recites, in part, "*a plurality of input logic units* with each of the input logic units being associated with one of the receive ports, and with each of the input logic units being operative to determine whether said associated receive port is saturated by determining whether a number of packets received via said associated receive port and currently stored in said shared memory exceeds a predetermined drop threshold value." Claim 16 recites a similar recitation and claim 27 specified that each receive port tracks the received packets and does the comparison with the drop threshold value. Even if it were accepted, as the rejection alleges, that the dropping of cells, in *Yang et al.*, somehow

effects a response to receive port saturation, such behavior does not occur by monitoring of cells received by each receive port. Since the dropping of cells occurs only when queues for the virtual circuits reach a threshold, the dropping cannot be responsive to saturation on any particular receive port.

Thus, Applicants respectfully assert that *Yang et al.* fails to teach or suggest taking into account incoming saturation. Given this failure, the combination of *Giroux et al.* and *Yang et al.* cannot teach or suggest all of the elements of claims 1, 16 and 27. As such, Applicants respectfully assert that the rejection of claims 1, 16 and 27 is improper for failing to teach or suggest all of the elements of those claims.

Additionally, with respect to the rejections of claims 30, 31 and 33-35, the Office cites *Basso et al.*, for its alleged teaching of generating backpressure signals. However, even if *Basso et al.* were accepted as teaching what has been suggested, which Applicants do not admit, *Basso et al.* would not cure the deficiencies of the *Giroux et al.* and *Yang et al.* discussed above. Thus, Applicants respectfully assert that the rejection of claims 30, 31 and 33-35 is improper and should be withdrawn.

Similarly, claims 2, 6-10, 17, 21-24, 28-31 and 33-35 all depend from independent claims 1, 16 and 27 and should be allowed for at least the same reasons as discussed above for the independent claims. Additionally, Applicants respectfully assert that claims 3-5, 11-15, 18-20, 25, 26, 32 and 36-40 should now also be allowed. As such, reconsideration and withdrawal of the all rejections are respectfully requested and it is respectfully requested that the application be allowed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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